



# COMPARATIVE **EXERCISE** **PHYSIOLOGY**

The International Journal of Exercise Physiology,  
Biomechanics and Nutrition

**CAMBRIDGE**  
UNIVERSITY PRESS

# Comparative Exercise Physiology

## Editor-in-Chief

D. Marlin, David Marlin Consulting Ltd, PO Box 187,  
Newmarket, Suffolk CB8 1BA, UK  
Tel: +44 1638 731298  
Email: dm@davidmarlin.co.uk

## North American Editor

K. McKeever, Rutgers University, USA

## Editorial Board Members

T. Art, University of Liege, Belgium  
E. Barrey, INRA, France  
W. Bayly, Washington State University, USA  
H. Clayton, Michigan State University, USA  
M. Coenen, University of Hanover, Germany  
R. Colborne, University of Bristol, UK  
A. Courouge-Malblanc, Pégase-Mayenne, France  
M. Davis, Oklahoma State University, USA  
H. Erickson, Kansas State University, USA  
B. Essen-Gustavsson, Swedish University of Agricultural  
Science, Sweden  
J. Foreman, University of Illinois at Urbana-Champaign, USA  
R. Geor, University of Guelph, Canada  
A. Goodship, Royal Veterinary College, UK  
P. Harris, WALTHAM Centre for Pet Nutrition, UK  
K. Hinchcliff, Ohio State University, USA  
D. Hodgson, University of Sydney, Australia  
J. Jones, University of California at Davis, USA  
P. Lekeux, University of Liege, Belgium  
M. Lindinger, University of Guelph, Canada  
A. Lindner, Arbeitsgruppe Pferd, Germany  
J. McCutcheon, Virginia Tech, USA  
B. Nielsen, Michigan State University, USA  
R. Rose, University of Sydney, Australia  
H. Schott, Michigan State University, USA  
B. Schroter, Imperial College, UK  
R. Slocombe, University of Melbourne, Australia  
J. Thomason, University of Guelph, Canada  
M. Tokuriki, Nihon University, Japan  
S. Valberg, University of Minnesota, USA  
M. Weishaupt, University of Zurich, Switzerland  
J. Wood, University of Cambridge, UK

## Submission of Manuscripts

Manuscripts should be submitted via our online manuscript  
submission and tracking site, [www.edmgr.com/ecep](http://www.edmgr.com/ecep).  
Full instructions for electronic submission are available  
directly from this site and from [journals.cambridge.org/cep](http://journals.cambridge.org/cep).  
To facilitate rapid reviewing, communications for peer review  
will be electronic and authors will need to supply a current  
e-mail address when registering to use the systems.

**Full Notes for Authors** are available from:  
[journals.cambridge.org/cep](http://journals.cambridge.org/cep), and an abbreviated version is  
printed at the back of this issue.

## Subscriptions

*Comparative Exercise Physiology* (ISSN 1478-0615) is  
published four times a year in February, May, August and  
November. The subscription price for institutions of Volume 6  
(2009) which includes electronic access and delivery by air is

£315 (US \$610 in the USA, Canada and Mexico);  
the electronic only price for institutions is £251 (US \$486  
in the USA, Canada and Mexico). Single parts are £81 (US  
\$156 in the USA, Canada and Mexico), plus postage.

Orders, which must be accompanied by payment, may be sent  
to a bookseller, subscription agent or direct to the publisher:  
Cambridge University Press, The Edinburgh Building, Shaftes-  
bury Road, Cambridge CB2 8RU, UK; or in the USA, Canada and  
Mexico: Cambridge University Press, Journals Fulfillment Depart-  
ment, 100 Brook Hill Drive, West Nyack, New York, 10994-2133.  
EU subscribers (outside the UK) who are not registered for VAT  
should add VAT at their country's rate. VAT registered subscribers  
should provide their VAT registration number. Japanese prices for  
institutions are available from Kinokuniya Company Ltd,  
P. O. Box 55, Chitose, Tokyo 156, Japan.

Copies of the journal for subscribers in the USA, Canada and  
Mexico are sent by air to New York to arrive with minimum  
delay. Periodicals postage paid at New York and at additional  
mailing offices. Postmaster: send address changes in the USA,  
Canada and Mexico to: *Comparative Exercise Physiology*,  
Cambridge University Press, 100 Brook Hill Drive, West  
Nyack, New York 10994-2133. Claims for missing issues  
should be made immediately on receipt of the subsequent issue.

## Advertising

Advertising queries for all parts of the world *except* the USA,  
Canada and Mexico to the Journals Advertising  
Co-ordinator: Rebecca Curtis, [ad\\_sales@cambridge.org](mailto:ad_sales@cambridge.org)  
Address enquiries in the USA, Mexico and Canada *only* to:  
[journals\\_advertising@cup.org](mailto:journals_advertising@cup.org)

## Copying

This journal is registered with the Copyright Clearance  
Centre, 222 Rosewood Drive, Danvers, MA 01923, USA.  
Organizations in the USA who are also registered with  
C. C. C. may therefore copy material (beyond the limits  
permitted by sections 107 and 108 of U. S. Copyright law)  
subject to promotional or commercial purposes. Code  
1478-0615/2009 \$16.00. *ISI Tear Sheet Service*, 3501 Market  
Street, Philadelphia, PA 19104, USA is authorized to supply  
single copies of separate articles for private use only.  
Organizations authorized by the Copyright Licensing Agency  
may also copy material subject to the usual conditions.  
*For all other use*, permission should be sought from Cambridge  
or the American Branch of Cambridge University Press.

## Internet Access

The online edition is available at: [journals.cambridge.org/cep](http://journals.cambridge.org/cep)  
with free table of contents alerts (upon registration).

## CAMBRIDGE UNIVERSITY PRESS

The Edinburgh Building, Shaftesbury Road, Cambridge CB2  
8RU, UK  
32 Avenue of the Americas, New York, NY 10013-2473, USA  
477 Williamstown Road, Port Melbourne VIC 3207, Australia

Typeset by Alden Prepress Services, Chennai, India.  
Printed by Latimer Trend, Plymouth, UK.

Front cover images: left, ©2007 Marcie Heacox; centre and  
right, Shutterstock.